

CLAIMS

We claim:

1. (Currently amended) A method of forming SiBCN-based ceramics[[preceramic polymers or oligomers]], comprising the steps of:

reacting a disilazane having the general formula $(R_3Si)_2NH$, where R is selected from the group consisting of vinyl, hydrogen, phenyl, and alkyls containing 1 to 3 carbon atoms with a boron halide including at least two halogens and a halosilane including at least two halogens at a temperature of between 125 °C and 300 °C, wherein a SiBCN preceramic polymer or oligomer is formed, and

pyrolyzing said preceramic polymer or oligomer at a temperature that ranges from 700 °C to 1600 °C in a nonoxidizing atmosphere, said method being exclusive of a curing step before said pyrolyzing step in a halogen comprising environment, wherein said preceramic polymer or oligomer is converted into a ceramic.

2. (Original) The method of claim 1, wherein said $(R_3Si)_2NH$ is $(CH_3)_3SiNHSi(CH_3)_3$.

3. (Original) The method of claim 1, wherein said boron halide is BCl_3 and said halosilane is R_1SiCl_3 , where R_1 is selected from the group consisting of vinyl, hydrogen, phenyl, and alkyls containing 1 to 3 carbon atoms.

4. (Original) The method of claim 1, wherein said preceramic polymer or oligomer is directly formed exclusively by said reacting step.

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5. (Original) The method of claim 1, wherein a chlorine content of said preceramic polymer or oligomer is less than 100 parts per million.

6. (Currently amended) The method of claim 1, wherein said [[preceramic polymer or oligomer]] ceramic is [[substantially]] amorphous as evidenced by featureless XRD data.

7. (Cancelled)

8. (Cancelled)

9. (Cancelled)

10. (Currently amended) A ceramic formed from the process recited in claim 1 [[9]].

11. (Withdrawn) A SiBCN-based preceramic polymer or oligomer, comprising:
a silicon comprising backbone including boron and nitrogen, wherein said preceramic polymer or oligomer includes a plurality trialkylsilylamino groups.

12. (Withdrawn) The polymer or oligomer of claim 11, wherein said trialkylsilylamino groups comprise a plurality of trialkylsilylamino, triarylsilylamino, trivinylsilylamino or hydridosilylamino groups.

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13. (Withdrawn) The polymer or oligomer of claim 11, wherein a chlorine content of said preceramic polymer is less than 100 parts per million.

14. (Withdrawn) A partially pyrolyzed SiBCN-based preceramic polymer or oligomer, comprising:
a silicon comprising backbone including boron and nitrogen, wherein said partially pyrolyzed preceramic polymer or oligomer provides hydrothermal stability and includes at least 3 wt % hydrogen.

15. (Withdrawn) The partially pyrolyzed preceramic polymer or oligomer of claim 14, wherein said % hydrogen is at least 4 wt %.

16. (Withdrawn) A burnable poison rod assembly (BPRA), comprising a bundle of control rods for insertion into a reactor core during refueling, said rods including said partially pyrolyzed preceramic polymer or oligomer of claim 14.

17. (Withdrawn) A spent fuel container (SFC) for storing spent nuclear fuel, wherein said SFC is formed from said partially pyrolyzed preceramic polymer or oligomer of claim 14.